



HW

Docket No.: 520.43709X00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:

Masaaki HOSOUCHI et al.

Serial No. 10/811,923

Filed: March 30, 2004

For: REMOTE COPY CONTROL METHOD

**SUPPLEMENTAL PETITION TO MAKE SPECIAL
UNDER 37 CFR \$1.102(MPEP \$708.02)**

June 13, 2005

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Supplemental to the Petition to Make Special filed on May 31, 2005,
Applicants submit the following additional remarks.

It is submitted that the cited references, whether considered alone or in combination, fail to disclose or suggest the invention as claimed. In particular, the cited references, at a minimum, fail to disclose or suggest in combination with the other limitations recited in the claims:

a first feature of the present invention as recited in independent claim 1 including obtaining an identifier of a first disk subsystem of a first volume, a volume pair list for registering an identifier of the first volume and an identifier of the first disk subsystem of the first volume, and searching route information including the identifier of the first disk subsystem based on a route list including

the route information for registering an identifier of a plurality of second disk subsystems for relay as a command transmitting route for the first disk subsystem and information for determining an identifier of a third disk subsystem connected to the host computer among the second disk subsystems;

a second feature of the present invention as recited in independent claim 6 including extracting identifiers of the different disk controllers from a volume pair list for registering an identifier of a first volume as a copy source or a copy destination in a volume pair of a remote copy target in the disk controllers and an identifier of a first disk controller including the first volume, generating a disk controller path list comprising a set of the identifiers of a pair of disk controllers, the pair having at least one of a first identifier and a second identifier of the disk controllers, which is different from those of another pair, serving as a volume pair included in the volume pair list, and generating a route list including route information including the identifier of the host computer, the identifier of the third disk controller, and the identifier of a fourth disk controller different from the identifier of the third disk controller in the set including the identifier of the third disk controller;

a third feature of the present invention as recited in independent claim 12 including extracting all volume pairs having at least one different identifier of an adapter of a first volume as a copy source or a copy destination of a remote copy target volume pair in the disk controller, from a list of all designated volume pairs for registering one and/or a plurality of the identifiers of the first volume and the adapter;

a fourth feature of the present invention as recited in independent claim 13 including transmitting first route information including an identifier of a first disk controller for a second disk controller having a logical path to the first disk controller, and transmitting, to the first disk controller, second route information additionally having an identifier of the second disk controller in the first route information, by the second disk controller which receives the first route information;

a fifth feature of the present invention as recited in independent claim 14 including obtaining an identifier of a first disk subsystem of a first volume as a copy source or a copy destination of a volume pair as a remote copy target in the disk subsystem, by referring to a volume pair list for registering an identifier of the first volume, and when the identifier of the first disk subsystem does not match an identifier of a third disk subsystem which receives the remote copy command, obtaining route information including the identifier of the first disk subsystem from a route list for registering route information on an identifier of a fourth disk subsystem which can transmit the remote copy command from the third disk subsystem and transmitting the remote copy command to the fourth disk subsystem indicated by the route information;

a sixth feature of the present invention as recited in independent claim 15 including inquiring an identifier of the first disk controller with an identifier of a third disk controller including a volume as a transmittal destination of the remote copy command, and obtaining, from the route information, route information

including the identifier of the third disk controller including the volume as the transmittal destination of the remote copy command;

a seventh feature of the present invention as recited in independent claim 16 wherein a memory for storing a volume pair list and a route list, the volume pair list for holding an identifier of a first volume as a copy source or a copy destination of remote copy and an identifier of a first disk subsystem of the first volume, and the route list for holding route information including information for determining an identifier of the host computer, the identifier of the first disk subsystem, an identifier of a second disk subsystem for relay as a transmitting route of the command to the first disk subsystem from the host computer, or an identifier of a third disk subsystem connected to the host computer among the second disk subsystems, and means for searching the route information including the first disk subsystem by referring to the route list and for obtaining the identifier of the third disk subsystem included in the route information;

an eighth feature of the present invention as recited in independent claim 19 loading, to a main memory, a volume pair list for registering an identifier of a first volume as a copy source or a copy destination of remote copy and an identifier of a first disk subsystem of the first volume, loading, to the main memory, a route list for holding route information including information for determining an identifier of the host computer, the identifier of the first disk subsystem, an identifier of a second disk subsystem for relay as a transmitting route of a command to the first disk subsystem from the host computer, and an identifier of a third disk subsystem connected to the host computer among the

second disk subsystems, and searching route information including the first disk subsystem by referring to the route list and obtaining the identifier of the third disk subsystem included in the route information; and

a ninth feature of the present invention as recited in independent claim 20 including preparing, in a memory, a volume pair list including an identifier of a first volume as a copy source or a copy destination of a volume pair as a remote copy target in the disk controllers and an identifier of a first disk controller including the first volume, preparing, in the memory, a disk controller path list comprising a set of the identifiers of a pair of disk controllers, the pair having at least one of a first identifier and a second identifier of the disk controllers, which is different from those of another pair, serving as a volume pair included in the volume pair list, preparing, in the memory, a route list including route information including the identifier of the host computer, the identifier of the second disk controller, and an identifier of a third disk controller different from the identifier of the second disk controller included in the set including the identifier of the second disk controller, and searching route information including the first disk controller by referring to the route list and obtaining an identifier of a fourth disk controller as the copy destination included in the route information.

To the extent applicable to the present Petition, Applicants submit that although the distinguishing feature(s) may represent a substantial portion of the claimed invention, the claimed invention including said feature(s) and their inter-operation provides a novel storage system and system and method related to or

implemented in or by said storage system not taught or suggested by any of the references of record.

The references considered most closely related to the claimed invention are briefly discussed below:

U.S. Patent No. 6,230,200 (Forecast et al.) discloses an allocation program that creates a list indicating a route through a file server for a data stream (in RAID). A command is provided for copying data from a video file server to a remote storage system. (See, e.g., column 2, lines 52-65; column 28, lines 36-49; and Figures 2-5.) However, unlike the present invention, Forecast et al. do not disclose, at a minimum, an identifier of first disk subsystem of first volume. Furthermore, Forecast et al. does not disclose registering an identifier of a plurality of second disk subsystems for relay as a command transmitting route for the first disk subsystem and a third disk subsystem. More particularly, Forecast et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 6, the above described third feature of the present invention as recited in independent claim 12, the above described fourth feature of the present invention as recited in independent claim 13, the above described fifth feature of the present invention as recited in independent claim 14, the above described sixth feature of the present invention as recited in independent claim 15, the above described seventh feature of the present invention as recited in independent claim 16, the

above described eighth feature of the present invention as recited in independent claim 19 and the above described ninth feature of the present invention as recited in independent claim 19 in combination with the other limitations recited in each of the independent claims.

U.S. Patent No. 6,574,667 (Blumenau et al.) discloses a routing table 46 for dynamic routing storage access requests from host processors through a switch to a data storage subsystem. Each entry of the routing table 46 includes an identifier of a next storage port for a loop to access. (See, e.g., column 8, lines 20-50; column 12, lines 22-28; column 13, lines 31-36; Figures 2-4 and 8-9.) However, unlike the present invention, Blumenau et al. does not disclose registering an identifier of a plurality of second disk subsystems for relay as a command transmitting route for the first disk subsystem and a third disk subsystem. Furthermore, Blumenau et al. does not disclose, at a minimum, a volume pair list and third disk subsystem. More particularly, Blumenau et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 6, the above described third feature of the present invention as recited in independent claim 12, the above described fourth feature of the present invention as recited in independent claim 13, the above described fifth feature of the present invention as recited in independent claim 14, the above described sixth feature of the present invention as recited in independent claim 15, the above described seventh feature of the present invention as recited in independent claim 16, the above described eighth

feature of the present invention as recited in independent claim 19 and the above described ninth feature of the present invention as recited in independent claim 19 in combination with the other limitations recited in each of the independent claims.

U.S. Patent Publication No. 2004/0225697 (Asano et al.) discloses a route information table 510 for managing information of the route of the data network used for replicating the volume. The table 510 includes a route ID 511 as an identifier representing the replication route between storages. An associated pair 515 identifies a replication pair of the volumes using the route and a policy 516 representing the properties of the route. A storage ID 212 represents an identifier of the storage to which the volume belongs. A storage volume ID 213 represents an identifier of the volume managed inside each storage in the storage device. A pair information table 230 includes PAIR ID 231. (See, e.g., paragraphs 37, 38, 68-69, 71, 77, 85-87, and 110; and Figures 1-5.) However, unlike the present invention, Asano et al. does not disclose, at a minimum, registering an identifier of a plurality of second disk subsystems for relay as a command transmitting route for the first disk subsystem and a third disk subsystem.

U.S. Patent Publication No. 2004/0254964 (Kodama et al.) discloses a first identifier 605 for specifying an addressable data portion ID, a second identifier 607 for specifying a further addressable ID. An original volume ID 605 and a copied volume ID 607 pair identify the specific volumes to be paired. A

virtual volume manager 521b adds a map 704 with predetermined rules/parameters for allowing or not allowing access attempts in a RAID device. (See, e.g., paragraphs 103-105, and 109-113; and Figures 5-6.) However, unlike the present invention, Kodama et al. does not disclose, at a minimum, an identifier of a plurality of second disk subsystems for relay as a command transmitting route for the first disk subsystem and a third disk subsystem, and a search route list. More particularly, Kodama et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 6, the above described third feature of the present invention as recited in independent claim 12, the above described fourth feature of the present invention as recited in independent claim 13, the above described fifth feature of the present invention as recited in independent claim 14, the above described sixth feature of the present invention as recited in independent claim 15, the above described seventh feature of the present invention as recited in independent claim 16, the above described eighth feature of the present invention as recited in independent claim 19 and the above described ninth feature of the present invention as recited in independent claim 19 in combination with the other limitations recited in each of the independent claims.

Japanese Patent 08-328760 (Hitoshi et al.) discloses hierarchy control rafters 5 inside a DAC 4 which access a routing table inside a cache memory 7

and recognize an entry corresponding to a sequence ID. (See, e.g., Abstract and Figure.) However, unlike the present invention, Hitoshi et al. does not disclose, at a minimum, registering an identifier of a plurality of second disk subsystems for relay as a command transmitting route for the first disk subsystem and a third disk subsystem. Furthermore, Hitoshi et al. does not disclose a volume pair list. More particularly, Hitoshi et al. does not disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 6, the above described third feature of the present invention as recited in independent claim 12, the above described fourth feature of the present invention as recited in independent claim 13, the above described fifth feature of the present invention as recited in independent claim 14, the above described sixth feature of the present invention as recited in independent claim 15, the above described seventh feature of the present invention as recited in independent claim 16, the above described eighth feature of the present invention as recited in independent claim 19 and the above described ninth feature of the present invention as recited in independent claim 19 in combination with the other limitations recited in each of the independent claims.

Therefore, since the cited references fail to disclose or suggest the above described first feature of the present invention as recited in independent claim 1, the above described second feature of the present invention as recited in independent claim 6, the above described third feature of the present invention

as recited in independent claim 12, the above described fourth feature of the present invention as recited in independent claim 13, the above described fifth feature of the present invention as recited in independent claim 14, the above described sixth feature of the present invention as recited in independent claim 15, the above described seventh feature of the present invention as recited in independent claim 16, the above described eighth feature of the present invention as recited in independent claim 19 and the above described ninth feature of the present invention as recited in independent claim 19 in combination with the other limitations recited in each of the independent claims, it is submitted that all of the claims are patentable over the cited references whether said references are taken individually or in combination with each other.

In view of the foregoing, Applicant requests that this Petition to Make Special be granted and that the application undergo the accelerated examination procedure set forth in MPEP 708.02 VIII.

Respectfully submitted,

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